

## WHAT IS CLAIMED IS

1       1. A power supply, comprising:  
2               an input receiving an input voltage;  
3               a selectively actuated boost converter coupled to the input and operable to  
4 selectively boost the input voltage; and  
5               a forward converter operable to convert the input voltage to a plurality of  
6 regulated output voltages.

1       2. The power supply of claim 1 wherein the selectively actuated boost converter  
2 includes means for comparing the input voltage to a reference voltage and boosting the input  
3 voltage above the reference voltage when the input voltage is less than the reference voltage.

1       3. The power supply of claim 1 wherein the plurality of output voltages are cross-  
2 regulated.

1       4. The power supply of claim 1 wherein the power supply produces the regulated  
2 output voltages for the input voltage which has a greater than 6.5:1 input ratio.

1       5. The power supply of claim 4 wherein the power supply produces the regulated  
2 output voltages across the input ratio with an efficiency in excess of about 75%.

1       6. The power supply of claim 1 wherein the forward converter provides ground  
2 isolation between the input voltage and the plurality of output voltages.

1           7.     The power supply of claim 1 wherein the forward converter includes a resonant  
2     reset circuit.

1           8.     The power supply of claim 1 wherein the forward converter utilizes a coupled  
2     output inductor to produce the plurality of output voltages.

1           9.     The power supply of claim 8 wherein the coupled output inductor is a trifilar  
2     wound, interleaved transformer.

1           10.    The power supply of claim 1 wherein the forward converter utilizes an isolation  
2     transformer.

1           11.    The power supply of claim 10 wherein the isolation transformer is a trifilar  
2     wound, interleaved transformer.

1           12.    The power supply of claim 1 further including, for each of the plurality of output  
2     voltages, a low drop-out regulator for producing a corresponding regulated output voltage.

1           13.    The power supply of claim 1 further including an input protection circuit coupled  
2     to receive the input voltage and provide over-current, over-voltage and line drop out protection.

1           14.    The power supply of claim 1 further including a linear regulator circuit couples to  
2     receive the input voltage and provide a start-up bias voltage.

1        15.    The power supply of claim 1 wherein the boost converter includes a circuit for  
2    disabling boost operation in response to a sleep mode control signal.

1        16.    The power supply of claim 15 further including, for each of the plurality of output  
2    voltages, a low drop-out regulator for producing a corresponding regulated output, each low  
3    drop-out regulator including a circuit for disabling the regulator in response to the sleep mode  
4    control signal.

1        17.    The power supply of claim 1 further including a supply status circuit that provides  
2    a visual indication of power supply operational status.

1        18.    The power supply of claim 17 wherein the visual indications include on, off and  
2    in sleep mode.

1           19.    A power supply circuit, comprising:  
2                   a voltage booster including:  
3                           a boost circuit to boost an input voltage to a boost voltage; and  
4                           a mode selector that activates the boost circuit if the input voltage is less  
5                           than a threshold voltage and deactivates the boost circuit if the input voltage is greater than the  
6                           threshold voltage; and  
7                           a multi-voltage output forward converter circuit that receives the input/boost  
8                           voltage and generates a plurality of DC output voltages therefrom.

1           20.    The power supply circuit according to Claim 19, further including a low drop-out  
2                   voltage regulator circuit for each of the plurality of DC output voltages.

1           21.    The power supply circuit according to Claim 19, wherein the multi-voltage output  
2                   forward converter circuit comprises:  
3                           a first transformer having a primary winding and a plurality of secondary  
4                           windings;  
5                           a second transformer having a plurality of windings corresponding to the plurality  
6                           of secondary windings, wherein the plurality of windings are coupled to the plurality of  
7                           secondary windings where the plurality of DC output voltages are generated.

1           22.    The power supply circuit according to claim 21 wherein the plurality of windings  
2                   on the second transformer form a coupled output inductance.

1           23. The power supply circuit according to Claim 21, wherein the multi-voltage output  
2 forward converter circuit further comprises:

3                   a sensor to sense one of the plurality of DC output voltages;  
4                   a switching circuit coupled to the primary winding of the first transformer, the  
5 switching circuit selectively actuated to draw energy through the primary winding of the first  
6 transformer in response to the sensed output voltage.

1           24. The power supply circuit according to Claim 23, wherein the switching circuit  
2 comprises:

3                   a switching device connected in series with the primary winding of the first  
4 transformer; and  
5                   a pulse width modulation control circuit generating a control signal for actuating  
6 the switching device, the control signal having a variable duty cycle set responsive to the sensed  
7 output voltage.

1           25. The power supply circuit according to claim 21 wherein the first and second  
2 transformers have a trifilar wound interleaved design.

1           26. The power supply circuit according to claim 19 wherein the input voltage and at  
2 least one of the plurality of DC output voltages are ground isolated.

1           27. The power supply circuit according to claim 19 wherein the forward converter  
2 circuit includes a resonant reset functionality which obviates a need for a discrete snubber  
3 circuit.

1           28. The power supply circuit according to claim 19 wherein the plurality of DC  
2 output voltages are cross-regulated.

1           29. The power supply circuit according to claim 19 wherein the forward converter  
2 circuit generates the plurality of DC output voltages at regulated levels across an input voltage  
3 ratio of at least 6.5:1.

1           30. The power supply circuit according to claim 19 wherein the forward converter  
2 circuit generates the plurality of DC output voltages at regulated levels across an input voltage  
3 ratio of at least 10:1.

1           31. The power supply circuit according to claim 19 further including an input circuit  
2 that smoothes the input voltage.

1           32. The power supply circuit according to Claim 31, wherein the input circuit  
2 includes both inductive and capacitive elements.

1           33. The power supply circuit according to Claim 32, wherein the inductive and  
2   capacitive elements are shared elements between the input circuit to smooth the input voltage  
3   and the voltage booster to boost the input voltage to the boost voltage.

1           34. The power supply circuit according to Claim 19, wherein the boost circuit of the  
2   voltage booster comprises a switching regulator for voltage step-up operation.

1           35. The power supply circuit according to Claim 34, wherein the switching regulator  
2   is a pulse width modulated regulator.

1           36. The power supply circuit according to Claim 19, wherein the mode selector  
2   implements a bypass operation to bypass the input voltage around the boost circuit when the  
3   input voltage is greater than the threshold voltage.